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An overview of prevention of multiple risk behaviour in adolescence and young adulthood

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ABSTRACT

The observed clustering, and shared underlying determinants, of risk behaviours in young people has led to the proposition that interventions should take a broader approach to risk behaviour prevention. In this review we synthesized the evidence on 'what works' to prevent multiple risk behaviour (focusing on tobacco, alcohol and illicit drug use and sexual risk behaviour) for policy-makers, practitioners and academics. We aimed to identify promising intervention programmes and to give a narrative overview of the wider influences on risk behaviour, in order to help inform future intervention strategies and policies. The most promising programme approaches for reducing *multiple* risk behaviour simultaneously address multiple domains of risk and protective factors predictive of risk behaviour. These programmes seek to increase resilience and promote positive parental/family influences and/or healthy school environments supportive of positive social and emotional development. However, wider influences on risk behaviour, such as culture, media and social climate also need to be addressed through broader social policy change. Furthermore, the importance of positive experiences during transition periods of the child–youth–adult phase of the life course should be appropriately addressed within intervention programmes and broader policy change, to reduce marginalization, social exclusion and the vulnerability of young people during transition periods.

Keywords adolescence, alcohol, illicit drug use, risk behaviour, sexual behaviour, smoking

Introduction

Many health risk behaviours are established during adolescence, and often maintained into adulthood, affecting health and wellbeing in later life. In the UK, the major problematic risk behaviours among young people include tobacco, alcohol and illicit drug use and sexual risk behaviour. Although some behaviours, such as smoking, have declined among young people in the UK over the past 10–20 years, health survey data indicate that the levels of most risk behaviours are still high, especially compared with other high-income countries.[1]

Substance (alcohol, tobacco and illicit drug) use and sexual risk behaviour share some common underlying determinants that protect young people from, or predispose them to, risky behaviour.[2–4] Perhaps unsurprisingly, there is evidence that these risk behaviours sometimes cluster together.[5–12] To date, most intervention programmes have targeted single risk behaviours, but there are proposals for interventions to take a broader approach, to address *multiple* problems and precursors.[13,14]

In our rapid review we sought to provide a synthesis of the international evidence on 'what works' to prevent multiple risk behaviour, for policy-makers, practitioners and academics. In this article, risk behaviours refer to tobacco, alcohol and illicit drug use and sexual risk behaviour. The aim of the literature review component was to identify promising intervention programmes for preventing multiple

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risk behaviour, focusing largely on the 'microenvironment'. However, the wider social determinants of health must not be overlooked. Therefore, in the discussion we also provide an overview of the wider social contexts that influence behaviour, to better inform future intervention strategies and governmental policies.

We systematically searched for reviews of intervention studies that had reported on multiple risk behaviour outcomes, including substance use *and* sexual risk behaviour. However, we found no such reviews, and therefore carried out two further searches: (1) we searched the published and grey literature for reviews (or reviews of reviews) focused on single risk behaviours, to identify effective intervention approaches across risk behaviours; (2) we performed a primary systematic review of experimental or quasi-experimental evaluations of interventions reporting on substance use *and* sexual risk behaviour outcomes. We used the AMSTAR quality assessment tool[15] to assess the methodological quality of reviews and the quality assessment tool for quantitative studies[16,17] to assess the quality of primary studies, excluding weak studies from our synthesis. A detailed description of the primary literature review methods[18] and the review of reviews methodology[19] are reported elsewhere. In our primary systematic review we sought interventions implemented in young people aged about 5 years (i.e. having started school) to 25 years, with a minimum of 6 months follow-up, and outcomes reported between ages 11 and 25 years.

In this article we present the key findings from these reviews, and an overview (using sources identified in an unstructured review) of the wider influences on risk behaviour and the implications for broader intervention approaches.

Effective intervention approaches identified from reviews addressing single risk behaviours

A range of approaches have been implemented to reduce risk behaviours, with varying degrees of effectiveness, as summarized in Table 1. From the reviews of these approaches we can draw some conclusions regarding the overall effectiveness of different approaches for preventing single risk behaviours, and, indirectly, the potential effectiveness of these approaches for preventing multiple risk behaviour.

Policy and mass-media interventions

A recent UK review concluded that increasing tobacco prices are effective in reducing smoking initiation and cessation in young people, although the impact on different socioeconomic groups is unclear.[20] There is robust evidence that alcohol pricing is inversely related to alcohol consumption, and that increased pricing is effective in reducing harmful outcomes such as drink driving and fatal road traffic accidents.[21–24] However, the evidence for the impact of increased pricing on alcohol consumption and on binge drinking among adolescents and young adults is less robust.[21,25]

There is also good evidence for mass-media interventions having an impact on smoking prevention and cessation among youths, although it is unclear whether mass-media programmes are more effective as part of a multi-modal intervention since the relative contribution of individual components have not been investigated.[26,27] Factors that affect the effectiveness of smoking-focused mass-media interventions include target audience, and duration and intensity of exposure.[27] However, the impact of media interventions on other substance use and sexual risk behaviour is unknown. Evidence for media interventions in preventing sexual risk behaviour is largely from low-income countries, and suggests that, as with smoking, media campaigns are most effective when multiple avenues are used simultaneously and are sustained over time.[28]

School-based programmes

The evidence picture for school-based interventions focused on modifying individual characteristics through curriculum-based interventions is very similar across risk behaviours.[29–33] While knowledge-giving school-based interventions are necessary, they appear insufficient in themselves in preventing risk behaviours. The evidence for the effectiveness of curriculum-based social influence and life skills training interventions (which focus on modifying individual characteristics) is very mixed, making interpretation of the effectiveness of this approach difficult. However, 'whole-school' interventions addressing the school ethos, such as the Gatehouse Project[34] are promising, and provide evidence that this approach can reduce substance use.[35]

Family/parenting programmes

Similarly, parenting/family-based programmes have been shown to impact on smoking, drinking and illicit drug use behaviour, but their effects on sexual behaviour have been less well studied.[31,36–39] The most promising family intervention, highlighted in recent Cochrane reviews, is the Strengthening Families Program for Parents and Youth 10–14, which has been shown to significantly reduce smoking, alcohol and

Table 1 Summary of evidence for effectiveness of interventions addressing single risk behaviours in adolescents and young adults

Intervention type	*Risk behaviour*			
	Smoking	*Alcohol*	*Illicit drugs*	*Sexual behaviour*
Pricing	Fairly good evidence of positive effect on youth smoking, although magnitude of effect is less clear. But, based on mainly survey studies in the USA and little data on impact by socioeconomic group.[a]	Robust evidence that alcohol consumption is related to alcohol price, and that pricing is one of the most effective means of reducing alcohol-related harm. It may be particularly effective in young people, but the evidence is less robust and remains equivocal.[b]	—	—
Access restrictions	Effective in reducing illegal sales, but few studies assessed the effect of smoking outcomes so impact on smoking behaviour is unknown. Evidence of possible greater impact on youths in higher stages of smoking uptake.[c]	Good evidence that alcohol availability restrictions impacts on alcohol consumption, but impact among young people is uncertain.[c]	—	—
Marketing restrictions	Good evidence that measures such as banning advertising can reduce tobacco consumption, if sufficiently comprehensive.[a]	Lack of studies investigating the effect of marketing restrictions on alcohol use (largely due to less well developed restriction policies).[c]	—	—
Mass-media intervention	Good evidence from controlled experimental and population interventions that media campaigns can be effective. They may be more effective in combination with other approaches than alone.[a]	Lack of studies looking at the impact of mass-media interventions. Their role in combination with other intervention types is unclear.[c]	Lack of studies looking at the impact of mass-media interventions. Their role in combination with other intervention types is unclear.[c]	Lack of studies looking at the impact of mass-media interventions in middle and high-income countries. Their role in combination with other intervention types is unclear.[c]
School-based intervention	Lack of evidence for information-giving alone being effective.[b] Mixed evidence for effectiveness of social influence and social competence interventions.[b] Some evidence to support whole-school approaches to improve school ethos and to support peer-led intervention to reduce smoking uptake.[b]	Mixed evidence, with some studies reporting effectiveness for some outcomes but not others, and other studies reporting no effectiveness or negative effects.[b]	Knowledge-focused programmes and programmes that build self-esteem and self-awareness impacted on mediating variables, but had no effect on drug use.[b] Life skills training programs impacted on cannabis use in some studies compared with usual curricula, but there is a lack of comparison with other program types.	No consistent evidence for an impact on sexual intercourse initiation, contraception use or pregnancy rates compared with regular sex/health education. High-quality sex education may be necessary, but insufficient on its own to reduce sexual risk behaviour.[c]
Parenting/family programme	Mixed evidence. Some high-quality studies suggest smoking uptake may be reduced.[b]	Some evidence from high-quality studies that family-based interventions, or those with a family component are effective when children are aged <10 and 10–16 years.[b]	Limited evidence; results from most existing studies were negative, but some evidence of effectiveness in a few studies, including those in early childhood. Further studies needed.	Some evidence of effectiveness for early childhood interventions, but the role of parenting/family programmes when children are teenagers is unclear.[b]
Community-based intervention	Mixed evidence. Most community interventions include a school-based component and have been compared with a no intervention/usual care group.[b]	Evidence of effectiveness in terms of reduced underage sales of alcohol and reduced drink-driving arrests among young people, but lack of robust studies with drinking behaviour outcomes.[c]	Lack of clear evidence of effectiveness; few robust studies performed, and most have added a community component to a school programme. Some evidence that this is more effective than school programs alone. In most cases, studies not designed to identify effects of individual components.[c]	Some evidence for multi-component youth development programmes impacting on contraception use and pregnancy rates among females, but evidence base largely 'high-risk' youth in mainly low-income areas. May be more appropriate as an intensive targeted approach for vulnerable youth.[b]
Multi-modal intervention	May be effective, but mixed evidence and studies not designed to identify effective components.[b]	Some evidence for effectiveness; effect of individual components not investigated.[b]		

[a]Good evidence for effectiveness.
[b]Mixed evidence for effectiveness.
[c]Limited evidence, largely due to lack of studies.

illicit drug use after 4 years.[31,40] The programme consists of weekly family sessions that encompass: clarifying expectations; appropriate discipline; managing strong emotions; effective communication and peer skills. Since this programme addresses some of the common underlying determinants of risk behaviour it may potentially also impact on sexual health, and is worthy of further research.

Multi-domain interventions

We did not identify any community-only interventions that reported specific effects on risk behaviours. The identified community interventions all contained intervention elements in other domains. The multi-domain approach (involving a combination of individual, family, school and community elements) has successfully reduced each of smoking, drinking and risky sexual behaviour, but again study results were a little mixed.[33,41,42] Studies such as the Minnesota Heart Health Programme and the Finnish North Karelia Project evaluated the impact of large-scale cardiovascular disease prevention programmes aimed at entire populations, and found significant reductions in smoking prevalence in young people in the intervention group. Project Northland, comprised of community, family and school components, shows considerable promise, with significantly less weekly and monthly alcohol use in the intervention group after 30 months follow-up and less binge drinking at 78 months follow-up.[38] One review of interventions to reduce sexual risk behaviour found that multi-modal youth development programmes had a significant effect on increasing contraception use and reducing pregnancy rates among girls.[32] These interventions largely included people from low-income urban settings and were more effective in girls than boys. Another review found that interventions that include education, skill-building and contraception promotion components significantly reduce unintended teenage pregnancies,[43] whilst a third review *did not* conclude that such multi-component interventions were effective.[29]

Key limitations of review

The main limitation of our review of reviews was that it was naturally dependent on and restricted by what was reported and discussed in the review literature, and, in particular, by how interventions were generally classified in review-level literature. As a result, we were limited in terms of identifying common effective features of successful interventions across risk behaviours (e.g. duration of intervention, use of booster sessions etc.). However, the heterogeneity of the design of primary studies made it difficult for the reviewing authors themselves to identify elements of successful interventions.

Evidence from primary studies reporting outcomes on both substance use *and* sexual risk behaviour

Our primary systematic review identified few studies that had evaluated the impact of interventions on substance use *and* sexual risk behaviour.[18] From 18 identified studies, 13 were considered to be of a moderate or high methodological quality, and most were school-based programmes. In general, programmes impacted on some behaviours but not others or had: an inconsistent effect across different measures of a behaviour; differential effects by gender; or short-term effects only. Heterogeneity between studies, in terms of programme, setting, population and outcome measures precluded pooling of study results to give summary estimates. Just three of the 13 studies - the Seattle Social Development Project (SSDP),[14] Focus on Kids (FOK) plus Improving Parent and Children Together (ImPACT),[44] and the Aban Aya Youth Project[45] - had a significant effect on at least one substance use *and* one sexual risk behaviour measure. The Aban Aya Youth Project, comprising individual, school, parent and community elements and implemented among 10–11-year olds, significantly reduced substance use and recent sexual intercourse among males only, with no effect on females.[45] FOK plus ImPACT, comprised of an individual and parenting programme and implemented among 15-year olds, significantly reduced past-month cigarette smoking, reduced pregnancy and increased condom use (with no report of outcome by gender).[44] The SSDP (which has individual, school and family components), implemented during Grade 1 of primary school, has followed participants into adulthood, with little attrition (7%). Among males and females, it significantly reduced heavy drinking, lifetime sexual activity and a history of multiple partners at age 18 and increased age at first sexual intercourse. At age 21, it increased condom use at last intercourse (among single people), reduced pregnancy and childbirth among women (but did not reduce causing pregnancy or fathering a child among men) and reduced the prevalence of having multiple partners.[14,46]

Other studies found positive effects on either substance use *or* sexual risk behaviour.[47–50] One African study, My Future is My Choice, reported effects on alcohol use and abstinence among baseline female virgins only.[48] Interestingly, the Gatehouse Project found positive effects on smoking, but no effects on sexual initiation among the original cohort, whereas a survey of a later cohort of the same age (4 years after the implementation of the programme) found no effect on substance use, but reduced sexual initiation.[34,51]

Limitations of existing primary studies

Shortcomings of many primary studies identified in our reviews include: methodological limitations (e.g. inappropriate control groups, high attrition and differing units of intervention allocation and analysis); relatively short-term follow-up in most studies; lack of replication of interventions in other populations or countries and lack of assessment of effectiveness by gender or socioeconomic status. Because of the latter, we were unable to draw firm conclusions regarding intervention approaches for *equitably* improving young people's health. However, a combined universal and targeted approach is likely to be needed, as discussed later.

Applicability and transferability of promising intervention programmes to the local context

As with many areas of public health, the identified evaluations were predominantly USA-based. Furthermore, most interventions were in urban areas, and often within population subgroups (e.g. socioeconomic or ethnic subgroups), which may limit generalizability of findings to other settings, populations and countries. However, a recent review of trials to reduce teenage pregnancy also included a review of qualitative research studies and assessed intervention need and appropriateness on the basis of young people's views and experiences. The content of the largely USA-based interventions identified did fit appropriately with factors associated with pregnancy risk in young women in the UK.[52] In addition, a comparison of studies in the USA and Australia of the underlying risk and protective factors for substance use found marked similarities between these factors.[2] This suggests that, certainly in high-income countries, risk and protective factors are probably similar, and interventions that address some of these factors effectively in one country could, with appropriate adaptation, be considered for implementation and evaluation in other countries.

Discussion

Promising approaches to preventing multiple risk behaviour

Our review of studies addressing single risk behaviours found that the evidence for effectiveness of most intervention approaches was mixed or limited due to few studies. Policy interventions and mass-media approaches, such as those to reduce smoking, have had some success. School-based curriculum-focused programmes appear to be insufficient on their own to prevent risk behaviour, but whole-school approaches that also address the school ethos and environment show some promise and should be further researched. Family/parenting programmes have also had mixed success, with the most promising intervention being the Strengthening Families Program for Parents and Youth 10–14. Maintaining family connectedness into the adolescent years, which is one of the aims of this programme, may help to reinforce and strengthen some of the protective factors needed to prevent risk behaviour. Multi-domain interventions have also had some success in reducing risk behaviour, although again, the evidence is mixed.

Interestingly, the common feature of programme interventions identified in our primary review that had an effect on both substance use *and* sexual risk behaviour is the multi-component nature of these interventions. The findings of our review of reviews and of our primary systematic review are consistent, in that complex interventions may be more effective than more traditional curriculum-only school programmes, perhaps reflecting the multi-faceted nature of the causes of risk behaviour and the need for interventions to address multiple dimensions of influence.

Although it was difficult to directly compare features of interventions, timing of the intervention is likely to be very important, particularly in relation to periods of transition, as discussed later. The limited effect of many interventions that we identified may be partially due to intervention timing. Programmes were commonly implemented at ages 11–12, during transition into adolescence, or at ages 13–14 years, when risk behaviours, or experimentation with them, may already have been initiated. The SSDP was the only identified programme implemented in the pre-adolescent *early* years of primary school. The success of this programme, especially in reducing sexual risk behaviour suggests that intervening in the early mid-childhood years, can have an impact on later risk behaviour. We are not suggesting that it is too late to intervene during teenage years, but are proposing that addressing underlying determinants of risk behaviour early in childhood *may* have a greater impact than *only* intervening in adolescence, and that such childhood programmes should be further researched.

It is important to note that although substance use and sexual risk behaviour share common underlying determinants of risk behaviour, the contribution of these factors to different risk behaviours varies. Survey data from 24 Scottish schools demonstrated that between-school variation in smoking behaviour, after controlling for individual socioeconomic and family sociocultural factors, was explained by large school-level characteristics such as the schools' focus on caring and inclusiveness.[53] In contrast, an analysis of predictors of sexual intercourse by the age of 16 years in the

same study found that much of the between-school variation was explained by individual socioeconomic and neighbourhood socioeconomic factors, rather than school-level characteristics.[54] These data highlight the varying contribution of school, individual and neighbourhood factors to different risk behaviour development and provide further support for a holistic approach to multiple risk behaviour prevention.

Universal versus targeted intervention

Our review primarily aimed to identify universal intervention approaches, rather than interventions targeted at selected 'high-risk' individuals. There is debate on the merits of universal versus targeted approaches. Universal approaches (e.g. school ethos programmes) can potentially influence the large number of children at low-to-moderate risk, as well as the small number of people who are at high risk. Furthermore, such approaches do not rely on targeting 'high-risk' individuals which can result in stigmatization and increased risk of precipitating 'reactive' risk behaviours.[55] However, strategies such as school interventions rely on children attending and engaging with school. Thus there is the potential for more disadvantaged children to benefit least (or not at all) from some programmes, and the risk of widening health inequalities. Therefore, similar to the recommended intervention approach to promoting positive early child development,[56] careful targeting embedded within universalism, and what Marmot calls proportionate universalism, might be the most effective approach. Intervention programmes should be appropriate to specific age periods within the child/youth stage of the life course, with a combination of different interventions needed at these different stages. However, these intervention programmes can be tailored to particular subpopulations; more intensive or prolonged programmes might be needed in more deprived communities, or, given differential effects on risk behaviour by gender in some studies, programmes might need to be tailored to boys and girls.

The bigger picture

Given the effect of very early childhood on positive child development, and the myriad of influences that young people are regularly exposed to, intervention programmes are only part of the solution to preventing adolescent risk behaviour. We must be careful not to overlook the bigger picture of the social determinants of health, which encompasses both downstream and upstream influences. In this brief overview we consider the potential role of these wider influences, since their effect on health risk behaviour in young people not only impact on risk behaviour, but may also limit the potential effect of particular programme interventions.

Effect of early childhood interventions on adolescent risk behaviour

Early childhood is the most important developmental period over the lifespan and impacts on health and well-being throughout the life course, influencing competency in literacy and numeracy, mental health, heart disease, criminality, and social participation at all life stages, including adolescence.[57] There is also evidence that depression, stress and anxiety in pregnant women may adversely affect the mother–child interaction through adverse modifications to the foetus *in utero* that permanently affect the babies' response to stress[58,59] and disruption of the mother's ability to be sensitive to their baby.[60] In turn, poor mother–child interaction and maltreatment predict a poor trajectory for children in terms of their future social, emotional, cognitive development and health.[61–63] Early childhood interventions, such as the High/Scope Perry Preschool Project,[64] the Nurse–Family Partnership,[65] the Carolina Abecedarian Project[66] and the Chicago Child–Parent Programme[67] have had positive effects on child development and well-being and life success in adulthood. However, although pre-school intervention can improve child development and life success, they are not always effective in preventing risk behaviour in young people. The Carolina Abecedarian project led to a significant reduction in teenage parenthood and cannabis use, but had no effect on tobacco or alcohol use, whereas the Chicago Child–Parent Programme had no effect on any risk behaviours. Events throughout the child–youth periods of the life course exert independent, cumulative and interactive effects on health and well-being. Investing in the early years has been demonstrated to result in large benefits in later years, with investment in preventive programmes aimed at disadvantaged children often being more cost-effective than later remediation.[68] However, this does not negate the need for investment at other stages of the life course, and continued investment in child and youth development is needed to ensure continued positive development throughout childhood, adolescence and into adulthood.

Legislative measures

Whilst it is sensible to consider broad approaches to reducing generic, or multiple, risk behaviour, various risk behaviour-focused measures should not be overlooked. For instance, regulatory and legislative measures that increase

price and impose marketing restrictions can help to reduce tobacco use by young people.[20] It remains to be seen whether access restrictions, including the removal of point-of-sale tobacco advertising will have a similar effect on smoking rates in young people. Alcohol pricing measures and access restrictions may potentially reduce alcohol use by young people, either directly or indirectly through changing culture patterns of substance use. However, restrictions on alcohol and tobacco sales may alter purchase patterns, with young people obtaining these substances through other avenues, including illegal sources. Legislative measures should therefore only be considered a part of a larger package of preventive measures and should be thoroughly evaluated to determine the effect on risk behaviour.

Wider influences on risk behaviour that need addressing

The impact of media on adolescent behaviour is also important, with studies demonstrating its influence on a variety of health behaviours.[69,70] The media industry could take more responsibility for the role they play in influencing young people's development, and parents need to be more aware of the role of media in their children's development and how to minimize that influence.[69] There has also been a global diversification in drink products over the past two decades, with the creation of drinks designed to meet the needs of subgroups of the youth market.[71] This has been accompanied by more aggressive marketing of alcohol drinks to young people, who are more susceptible to advertising influences than adults.[72,73] Young people themselves recognize the impact alcohol marketing has, with the Scottish Youth Commission on Alcohol having included stricter regulation of alcohol marketing among its recent recommendations to the Scottish Government.[74]

Context matters: youth transitions and social climate

Early childhood through to young adulthood includes various transition periods, each with the potential for increasing young people's *vulnerability*, which, in life-course epidemiology, is defined as the process of negative adaptation in the face of adversity.[75] It is therefore necessary to understand the nature of transitions from childhood to adolescence and adolescence to adulthood, with the aim of increasing young people's *resilience* to adversity during these periods. The transition from childhood to adolescence is accompanied by the move from primary to secondary school. This transition period has been shown to impact on health and well-being in later adolescence, with individual characteristics, and in particular, personal attributes, the strongest predictors of successful transition.[76]

Recent studies of young people in transition to adulthood highlight the importance of social mobility, education, personal competence and resilience, as well as gender, neighbourhood deprivation and family support.[77] Continuation of many health risk behaviours beyond the 'experimental' teenage years is associated with socioeconomic status. Young people from more deprived backgrounds are at an increased risk of lower educational attainment, which is a strong predictor of adverse transitional experiences and patterns of social inclusion.[78] Improved educational opportunities for the less well qualified and a reduction in family poverty and community deprivation should theoretically lead to reduced vulnerability and social exclusion.

Youth transitions are also becoming more protracted and complex, with routes from education to work and housing and domestic transitions becoming more fragmented. This means that young people now spend more time in the company of their peers, who have taken on a greater importance in shaping attitudes and behaviours.[78] Furthermore, longer transition periods (through protracted periods of further education, unemployment, homelessness, etc.) lead to an increase in the window of risk and vulnerability, irrespective of socioeconomic status and educational attainment.

Social context also plays a role in the development of risk behaviours. In addition to pricing and availability (relevant to substance use) and marketing and media, key societal factors influencing risk behaviour include cultural norms, access to attractive leisure and social facilities, and opportunities for engaging in health-enhancing activities. Increased alcohol consumption and changing drinking patterns have resulted in a culture of excessive drinking among adults, and latterly, adolescents. In the 2004 Scottish Social Attitudes Survey, two-thirds of the sampled population agreed that 'drinking is a major part of the Scottish way of life'. Among young people, drinking is viewed as central to socializing, and is often reported as being the only leisure option available.[73] In addition, making positive choices is far more difficult in areas where communities have high access to health-damaging products, and low access to leisure and social facilities.[73,79]

Conclusions

Given that relatively few studies have evaluated the impact of interventions on substance use *and* sexual risk behaviour, evaluations of future programmes should, *where possible*, collect and report on multiple risk behaviour outcomes. These studies should have sufficiently long follow-up to detect intervention effects that take longer to become

established, or to wash out, and should assess effects of interventions by gender, ethnicity and socioeconomic status.

To date, the most promising intervention programme approaches for reducing *multiple* risk behaviour simultaneously address multiple domains of risk and protective factors predictive of risk behaviour. These interventions largely aim to increase young people's resilience, supported by promoting positive parental/family influences and/or healthy school environments supportive of positive social and emotional development.

In addition to implementing appropriate intervention programmes, steps are needed to reduce the exposure of young people to negative influences, and to increase opportunities for engaging in activities that nurture positive development. Governmental policy-makers should be aware of and act on the evidence that broader social change is needed, to reduce the societal influences on youth development and behaviour and to reduce marginalization, social exclusion and the vulnerability of young people during periods of transition.

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